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EXAMINER	
KIM, CHONG R	

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/765,621	TAKEO, HIDEYA	
	Examiner	Art Unit	
	Charles Kim	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7,11-13,17 and 21-30* is/are rejected.

7)☒ Claim(s) *4-6,8-10,14-16 and 18-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 22, 2005 has been entered.

Response to Amendment and Arguments

2. Applicant's amendment filed on February 14, 2005 has been entered and made of record.

3. In view of applicant's amendment, the double patenting rejection is withdrawn.

4. In view of applicant's amendment, the claim objections are withdrawn.

5. In view of applicant's amendment, the 112 first paragraph enablement rejections are withdrawn.

6. In view of applicant's amendment, the 112 second paragraph rejections are withdrawn.

7. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (pages 20-21) that their claimed invention (claims 1, 2, 11, 12) differ from the prior art because "there is no indication that only grid line spectral component 380 is subject to compression. For example, high intensity regions of the x-ray image are also removed before processing to facilitate removal of grid line artifacts...Consequently, Yazici does not

disclose reducing a transformed image signal in only the vicinity of an array direction of the periodic pattern." The Examiner disagrees. Yazici clearly indicates in figures 7-8 that only the grid line spectral component 380 is suppressed. Furthermore, in response to the Applicant's argument that the high intensity regions are removed, the Examiner points out that the high intensity regions are removed **before** the frequency transformation is applied (col. 5, lines 37-40), as opposed to reducing the transformed image, as recited in claims 1 and 2. Yazici also explains that the regions removed/replaced from the image (edgy regions and high intensity regions) are added back to the image after processing (col. 6, lines 62-65).

Applicants further argue (pages 21-22) that "the Examiner misread the descriptions on col. 7, lines 5-7 of Hara, namely, 'the frequencies of 3.4 cycles/mm and 4.0 cycles/mm are the frequencies corresponding to the stationary grids, which are utilized ordinarily.' The Examiner appears to have interpreted that ordinarily, both stationary grids with frequency 3.4 cycles/mm and 4.0 cycles/mm are simultaneously used even during obtainment of a single image...Hence, Hara does not disclose two-dimensional suppression processing for two-dimensional stationary grids, but discloses two-dimensional suppression processing for a one-dimensional stationary grid." The Examiner responds by inviting the Applicant to provide a logical explanation of how a conclusion was made based on the previous office action that the Examiner misread the descriptions on col. 7, lines 5-7 and interpreted that both grids with frequency 3.4 cycles/mm and 4.0 cycles/mm are simultaneously used even during obtainment of a single image. The Examiner notes that col. 7, lines 5-7 were cited in the previous office action to provide support for reducing a two dimensional pattern--a stationary grid. Furthermore, it is unclear how Hara discloses a

two-dimensional suppression processing for reducing a one dimensional stationary grid, as Applicants contend. Note that a stationary grid is inherently two-dimensional.

Applicants further argue (page 25) that their claimed invention (claims 3 and 13) differ from the prior art because "Hara only discloses the transforming step in the present invention and does not disclose the reducing step." The Examiner disagrees. Hara's reducing step is incorporated in the transforming step, which is in line with the description provided on the bottom of page 41 and the top of page 42 of the Applicant's specification. Furthermore, the Applicants themselves admit that Hara discloses the reducing step. For example, Applicants state (page 25) that "the Examiner has cited Hara's descriptions on col. 6, line 66-col. 7...these descriptions correspond to the reducing step of the present invention."

Applicants further argue (page 26) that "since Hara only needs to produce a reduced size image, in which stationary grid components are suppressed, it is not necessary to perform inverse-wavelet transformation in Hara. The Examiner disagrees. Hara clearly explains that an inverse-wavelet transformation is performed on the reduced image (col. 1, line 64-col. 2, line 8).

Claim Objections

8. Claim 25 is objected to because the phrase "apparatus of claim of Claim 24" is grammatically incorrect. It appears that the applicant intended the phrase to read "apparatus of claim 24". A similar objection is applicable to claim 26. Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. Claims 7 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Referring to claim 7, the phrase "said transformed image signals which contains a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used" in lines 3-5 is not sufficiently described in the applicant's specification. The Examiner was unable to find an instance in the applicant's specification that provides support for transformed image signals which contain a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used. The closest instance to this feature appears to be on pages 7 and 11 (as pointed out by the applicants). However, these pages of the applicant's specification appear to indicate that the transforming step and the reducing step can be performed on each stationary grid to be used. Nowhere does it state that the transformed image signal contains a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used. A similar rejection is applicable to claim 17. Note: It appears that the applicant intended the phrase to read that the transformed image signals contain a range or subset of the frequency components corresponding to a grid array frequency of each possible stationary grid that may be used, such as recited in claims 27 and 28.

10. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Referring to claim 1, the phrase "in only the vicinity of an array direction of said periodic pattern" in lines 8-9 renders the claim indefinite because it is unclear what the "vicinity of an array direction" means. For examination purposes, the phrase will be interpreted as a direction less than 90 degrees from the array direction. Similar rejections are applicable to claims 2, 11, 12, 27, 28.

Referring to claim 29, the phrase "said predetermined frequency" in line 3 lacks antecedent basis. It appears that the applicant intended the phrase to read "a predetermined frequency". Appropriate correction is required.

Claims not mentioned specifically are dependent from indefinite antecedent claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1, 2, 11, 12, 21, 24, 27, 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Yazici et al., U.S. Patent No. 6,333,990 ("Yazici").

Referring to claim 1 as best understood, Yazici discloses a periodic-pattern suppression method of reducing a spatial frequency component which forms a periodic pattern contained in an original image signal, the method comprising the steps of:

a. transforming the original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain (col. 3, lines 50-54), and

b. reducing a transformed image signal of the transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a frequency of the periodic pattern in only the vicinity of an array direction of the periodic pattern, not reducing any of the transformed image signals in a different direction from the vicinity of the array direction of the periodic pattern [col. 3, line 50-col. 4, line 2 and figures 7-8. Note that the reduced "grid line spectral component" (380) is in the vicinity of an array direction of the periodic pattern, since the grid line spectral component constitutes the periodic pattern], and then transforming the transformed image signals into an inverse transformed signal in real space domain (col. 6, lines 58-65).

Referring to claim 2 as best understood, Yazici discloses a periodic-pattern suppression method of reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal, the method comprising the steps of:

a. transforming the original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain (col. 3, lines 50-54), and

b. reducing a transformed image signal of the transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of the stationary grid, which is actually used, in only the vicinity of a grid array direction of the stationary grid, not reducing any of the transformed image signals in a different direction from the vicinity of the array direction of the periodic pattern [col. 3, line 50-col. 4, line 2 and figures 7-8. Note that the reduced "grid line spectral component" (380) is in the vicinity of the grid array direction of the stationary grid, since the grid line spectral component constitutes the stationary grid], and then transforming the transformed image signals into an inverse transformed signal in real space domain (col. 6, lines 58-65).

Referring to claim 11, see the rejection of at least claim 1 above.

Referring to claim 12, see the rejection of at least claim 2 above.

Referring to claim 21, Yazici discloses a periodic-pattern suppression method of reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal photographed using the stationary grid, the method comprising the steps of:

a. transforming the original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain (col. 3, lines 50-54),

b. reducing a transformed image signal of the transformed image signals which has a desired frequency range (390) containing a spatial frequency component (380) corresponding to at least a grid array frequency of the stationary grid having a low range end (378) and a high range end (382) in only the vicinity of a grid array direction of the stationary grid [col. 3, line 50-col. 4, line 2 and figures 7-8. Note that the reduced "grid line spectral component" (380) is in the

vicinity of the grid array direction of the stationary grid, since the grid line spectral component constitutes the stationary grid],

c. frequency components greater than the high end range are not suppressed and lower than the low end rage are not suppressed by filtering (figures 7-8).

Referring to claim 24, see the rejection of at least claim 21 above.

Referring to claim 27, Yazici further discloses that the reducing step reduces the transformed image signals of the transformed image signals which has a desired frequency range (390) containing a spatial frequency component corresponding to at least a grid array frequency (380) of each possible stationary grid that may be used in only the vicinity of a grid array direction of each stationary grid (figures 7-8. Note that the grid array frequency 380 is not a set value, but is the value of each possible stationary grid that may be used).

Referring to claim 28, see the rejection of at least claim 27 above.

12. Claims 1, 2, 3, 11-13, 22-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Hara, U.S. Patent No. 6,173,086 ("Hara").

Referring to claim 1 as best understood, Hara discloses a periodic-pattern suppression method of reducing a spatial frequency component which forms a periodic pattern contained in an original image signal, the method comprising the steps of:

a. transforming the original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain (col. 4, lines 50-60), and

b. reducing a transformed image signal of the transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a frequency of the periodic pattern in only the vicinity of an array direction of the periodic pattern, not reducing any of the transformed image signals in a different direction from the vicinity of the array direction of the periodic pattern [col. 5, lines 49-65 and col. 6, lines 54-65. Hara explains that the reducing step is performed along each of the main scanning direction and the sub-scanning direction (vertically and horizontally). Accordingly, the reducing step is performed in only the vicinity of the array (grid) direction, and none of the transformed image signals in a different direction from the vicinity of the array direction is reduced], and then transforming the transformed image signals into an inverse transformed signal in real space domain (col. 1, line 64-col. 2, line 8).

Referring to claim 2 as best understood, Hara discloses a periodic-pattern suppression method of reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal, the method comprising the steps of:

a. transforming the original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain (col. 4, lines 50-60), and

b. reducing a transformed image signal of the transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of the stationary grid, which is actually used, in only the vicinity of a grid array direction of the stationary grid, not reducing any of the transformed image signals in a different direction from the vicinity of the array direction of the periodic pattern [col. 5, lines 49-

65 and col. 6, lines 54-65. Hara explains that the reducing step is performed along each of the main scanning direction and the sub-scanning direction (vertically and horizontally). Accordingly, the reducing step is performed in only the vicinity of the array (grid) direction, and none of the transformed image signals in a different direction from the vicinity of the array direction is reduced], and then transforming the transformed image signals into an inverse transformed signal in real space domain (col. 1, line 64-col. 2, line 8).

Referring to claim 3, Hara further discloses that the transforming step obtains the plurality of transformed image signals by applying two-dimensional wavelet transformation to the original image signal by the use of a low-pass filter which splits a band so that its response at a frequency greater than the spatial frequency of the stationary grid becomes approximately zero (col. 6, line 66-col. 7, line 15 and figure 3), and the reducing step further applies a process of reducing a component less than a predetermined frequency [col. 6, lines 22-27. Note that the high-pass filter (11) reduces a component less than a predetermined frequency], and performs inverse wavelet transformation, with respect to a signal of the transformed image signals which contains a spatial frequency component corresponding to the grid array frequency (col. 1, line 64-col. 2, line 8).

Referring to claim 11, see the rejection of at least claim 1 above.

Referring to claim 12, see the rejection of at least claim 2 above.

Referring to claim 13, see the rejection of at least claim 3 above.

Referring to claim 22, Hara further discloses that the stationary grid is a vertical grid (col. 2, lines 58-63 and figure 2) and the transformed image signals comprise frequency components

of a two-dimensional wavelet transformation, the transformed image signals being subjected to a one dimensional transformation in the vertical scanning direction (col. 5, lines 49-65).

Referring to claim 23, Hara further discloses that the stationary grid is a horizontal grid (col. 2, lines 58-63) and the transformed image signals comprise frequency components of a two-dimensional wavelet transform, the transformed image signals being subjected to one dimensional wavelet transformation in the horizontal scanning direction (col. 5, lines 49-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yazici et al., U.S. Patent No. 6,333,990 ("Yazici") and Hara, U.S. Patent No. 6,173,086 ("Hara").

Referring to claim 25, Yazici further discloses that the stationary grid is a vertical grid [col. 5, lines 56-67. Yazici discloses a one-dimensional Fourier transform approach for the grid suppression process (figures 7-8), but explains that a two-dimensional Fourier transform approach can be used if the grid lines are not perpendicular to the "x" and "y" coordinates of the image (col. 6, lines 1-16). Accordingly, the grid lines in the one-dimensional Fourier transform approach are interpreted as being perpendicular to the "x" and "y" coordinates of the image.], but

does not explicitly disclose that the transformed image signals comprise frequency components of a two-dimensional wavelet transformation, the transformed image signals being subjected to a one dimensional transformation in the vertical scanning direction. However, this feature was exceedingly well known in the art. For example, Hara discloses a vertical stationary grid (col. 2, lines 58-63 and figure 2), and transforms image signals into frequency components based on a two-dimensional wavelet transform, the transformed image signals being subjected to one dimensional wavelet transformation in the vertical scanning direction (col. 5, lines 49-65).

Yazici and Hara are combinable because they are both concerned with image processing methods for removing a stationary grid pattern from image data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transforming process of Yazici in view of Hara. The suggestion/motivation for doing so would have been to reduce the grid patterns while maintaining good image quality (Hara, col. 2, lines 34-40). Therefore, it would have been obvious to combine Yazici with Hara to obtain the invention as specified in claim 25.

Referring to claim 26, Yazici further discloses that the stationary grid is a horizontal grid [col. 5, lines 56-67. Yazici discloses a one-dimensional Fourier transform approach for the grid suppression process (figures 7-8), but explains that a two-dimensional Fourier transform approach can be used if the grid lines are not perpendicular to the "x" and "y" coordinates of the image (col. 6, lines 1-16). Accordingly, the grid lines in the one-dimensional Fourier transform approach are interpreted as being perpendicular to the "x" and "y" coordinates of the image.], but does not explicitly disclose that the transformed image signals comprise frequency components of a two-dimensional wavelet transformation, the transformed image signals being subjected to a

one dimensional transformation in the horizontal scanning direction. However, this feature was exceedingly well known in the art. For example, Hara discloses the step of transforming image signals into frequency components based on a two-dimensional wavelet transform, the transformed image signals being subjected to one dimensional wavelet transformation in the horizontal scanning direction (col. 5, lines 49-65).

Yazici and Hara are combinable because they are both concerned with image processing methods for removing a stationary grid pattern from image data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the transforming process of Yazici in view of Hara. The suggestion/motivation for doing so would have been to reduce the grid patterns while maintaining good image quality (Hara, col. 2, lines 34-40). Therefore, it would have been obvious to combine Yazici with Hara to obtain the invention as specified in claim 26.

14. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Hara, U.S. Patent No. 6,173,086 ("Hara") and Barski et al., U.S. Patent No. 6,269,176 ("Barski").

Referring to claim 29 as best understood, Hara further discloses the process of reducing a component less than a predetermined frequency [col. 6, lines 22-27. Note that the high-pass filter (11) reduces a component less than a predetermined frequency], but does not explicitly disclose that the reducing step judges the grid array direction of the stationary grid, and applies the process of reducing a component less than the predetermined frequency based on the result of the judgment.

Barski discloses a method for reducing a grid structure in an image based on a judged grid array direction of a stationary grid (col. 8, line 30-col. 9, line 10).

Hara and Barski are combinable because they are both concerned with reducing a periodic pattern in an image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the reducing step of Hara so that it is based on the judged grid array direction, as taught by Barski. The suggestion/motivation for doing so would have been to provide faster processing and the preservation of detail in the image (Barski, col. 2, lines 50-57). Therefore, it would have been obvious to combine Hara with Barski to obtain the invention as specified in claim 29.

Referring to claim 30, see the rejection of at least claim 29 above.

Allowable Subject Matter

15. Claims 4-6, 8-10, 14-16, 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
March 23, 2005

Jon Chang
Primary Examiner